Mathematics II

Fourth Practice

1. Find the eigenvalues and the eigenvectors of the following matrices:

$a)$ $\begin{pmatrix} 1 & -5 \\ -5 & 1 \end{pmatrix}$; $b)$ $\begin{pmatrix} 1 & 2 \\ 2 & -2 \end{pmatrix}$; $c)$ $\begin{pmatrix} 2 & 4 \\ 5 & 3 \end{pmatrix}$;

$d)$ $\begin{pmatrix} -1 & 0 & 1 \\ 3 & 0 & -3 \\ 1 & 0 & -1 \end{pmatrix}$; $e)$ $\begin{pmatrix} 3 & -1 & 1 \\ 2 & 0 & 1 \\ -2 & 1 & 0 \end{pmatrix}$; $f)$ $\begin{pmatrix} 3 & 2 & 1 \\ 0 & 2 & 3 \\ 0 & -1 & -2 \end{pmatrix}$;

2. Determine if the matrices in the previous exercise are diagonalizable. For each diagonalizable matrix find a basis in which the matrix is diagonal and write it in its diagonal form.